6. Functions when external powered

6.1 General
- All the battery mode functions are also available
- If GSM is set to 1 or 2=ON, the LC 300 will be all the time registered in the GSM network !
  (GSM set to 1 = Handy-Mode, GSM set to 2 = DataCenter-Mode)
  Means can be reached remotely with the respective G,S,T or M message.

6.2 Additional function
- the setting "GSM sen" has one new function
  4 = measure every approx. 2 hours (only Alarm- and Error-SMS will be sent ; no control SMS)
  (the SMS will be sent if min. Alarm, max. Alrarm or Error ; see also 1. or the Video Tutorials)
  Important : If "GSM" is set to 1 = ON the LC will start to measure only if it's registered into the GSM network (Antenna Symbol at least with two bars) ; means if no SIM card is put, the LC will never measure !!!

Warning : The above mentioned setting is not a standard function ! If error codes occur, it can happen that every approx. 2 h a SMS's is sent. This can create huge cost if you use contractual SIM-Cards !!!

6.3 Remote messages (sent from any handy or from the DataCenter of your PC)

6.3.1 S- and C-SMS (see 4.2.2.1 und 4.2.2.2)

6.3.2 T-message = change remotely the telephone numbers of the receivers (see also 4.2.2.3)
T+0,+0, (both Numbers are switched OFF)
Warning : x-substitution not working !
T+41793031234,+0, (the first Number is set, the second Number is OFF)
T+0,+41703031234, (the first Number is OFF, the second Number is set)
T+4917156721234,+41793031234, (both numbers are set)

6.3.3 M-message = remote request for measurement and SMS
M (the LC 300 will make a measurement and send back a SMS with the Data)

7. Maintenance & Service

The LC 300 doesn't need any maintenance. Only the batteries should be checked once an year to avoid spilling of aggressive fluids into the device.
Important: If you notice any damage on the housing or control elements during the operation dismount the device immediately and send it back to an authorized service facility. Close the tank inlet again to avoid pollution.
If the LC 300 shows an unexpected behavior, please reset the LC 300 (see also 2)
If the problem persists send the LC 300 to an authorized service facility.

8. Warranty

For our warranty conditions see our home page www.secu-tech.at or www.esiproduction.ch !
Read also the General Terms and Conditions.

9. Technical specifications

		LC300 Server	Clever Sensor
- UltraSonic level measurement :			19 to 270 cm
- Beam angle :			less than 20 degrees
- Measurement precision (calibrated at 20 degrees Celsius) :			-+ 1 cm
- Power supply :			
> 4 batteries :		1,5 V, type C, Alkali	1,5 V, type C, Alkali
> Consumption	- measurement :	NA	~ 22 mA
	- normal mode :	~ 12 mA	~ 12 mA
	- sleeping mode "non PS" :	~ 0,43 mA	NA
	- sleeping mode "PS" :	~ 0,12 mA	~ 0,07 mA
> Battery life time :		~ 3 years (depends of other settings and the GSM Network)	~ 3 years
- GSM		2 band	NA
- RF		434,430.5,437.5,439.75MHz	434,430.5, (437.5,439.75)
- RF range :		- free distance = 120m - through two armed concrete walls = 15m	
- Dimensions :		131x86x64 mm	180x85 mm
- Threads		1,1/2" / 2"	1,1/2" / 2"
- Weight :		~ 620 g	~ 550 g
- LCD Display :		1 x 6 & 1 x 5 digits	NA
- Protection:		IP 65	IP 65
- Material :		ABS black	ABS black transparent
- Temperature :		- 20°C ... +45°C	- 10°C ... +45°C
- Norm :		CE / ROHS	CE / ROHS

Security & Electronic Technology, Aumühlweg 3/1, A-2544 Leoberdorf - Austria
ESI production GmbH, Grèves du Lac 59, 1568 Portalban - Switzerland

LC 300 (SW Version 0.72 / 1.49 for CS and above)

Here below you find the user manual "short Version"
Please watch also the Video Tutorials under http://web.mac.com/esiproduction (not vet available)

LC 300 Server

Clever-Sensor

1. Functional overview :

1.1 Via radio frequency the LC300 Server can communicate with up to 6 Clever Sensors (CS), will compute the data and if requested send them per SMS to up to 2 recipients.
In a site till 4 servers with 6 CS each can be installed. Each Server and the related CS have their own frequency. On the CS only two frequencies can be chosen. If CS with the other 2 frequencies have to be installed, it has to be specified on the order "special f" !!!

1.2 The CS measures per ultrasonic the level, captures the temperature and communicates the data via radio frequence to the LC300 Server. This is done once a day, respectively as often the Server requests a measurement (the last statement is valid only if the LC300 Server is external powered)

1.3 Tank-shapes : rectangular, horizontal cylindrical, vertical cylindrical)

1.4 Battery level symbol

1.5 The GSM signal strength is measured and displayed

1.6 Ambient Temperature

1.7 Calendar (Date and Time)

1.8 One level measurement per day ; the time of measurement settable !

1.9 Statistical Data :
- average consumption of the last 7 days
- remaining days

1.10 Minimal and maximal alarm-level settable

1.11 Send a SMS if min./max level reached

1.12 Send a SMS if a error code is active (see also 4.1), respectively :

1.13 Send a control SMS :
- during 7 days every day after having put the LC 300 into operation
- every 28th of the month
- or 2 weekly
- or weekly

The SMS will always be sent immediately after the level measurement

1.14 The LC can send the SMS to two different receivers
(those Phone numbers can be set via the two buttons of the LC)

1.15 All the parameters, including the phone numbers can be transferred by SMS from a cellular phone

1.16 The LC 300 status is showed with Error codes which are also transferred by SMS. (see also 1.12 & 4.1)

2. General information :

There are two buttons :
- "Mode" = wakes up the device or navigates from one function to the other
- "Arrow" = increments the value of the flashing digit or launches a measurement
  (the data of such a manual measurement is not taken in the statistics and never a SMS is sent)
- If you press both buttons at the same time, the device is reset !
- If you press again the "Arrow" button during the display is showing "reset", the statistical data are set to zero and the 7 day cycle starts again

3. Put into operation the Clever Sensor (CS) :

3.1 Open the device (turn the battery housing part a half turn to the left)

3.2 Put the batteries

3.3 Set the CS address on the DipSwitches (the addresses are 1-6 depending the number of installed CS)
Set first all the Dipswitches to ON (address 0) ! Now set the address according the CS's to be installed :
Addr. 1 = Switch 1 OFF / Addr. 2 = Switch 2 OFF / Addr. 3 = Switch 1 & 2 OFF
Addr. 4 = Switch 3 OFF / Addr. 5 = Switch 1 & 3 OFF / Addr. 6 = Switch 2 & 3 OFF

3.4 Chose the radio frequence : Switch 4 ON = frequence 434 Mhz (default) ; Switch 4 OFF = frequence 430.5 Mhz
If "Special f" chose : Switch 4 ON = frequence 437.5 Mhz ; Switch 4 OFF = frequence 439.75 Mhz

3.5 Check the set address ! (press shortly the reset button ; the LED's will flash now as many times as the set address !)
3.6 Close again the CS (close it tied enough to insure that it's really sealed) ;
The CS is now ready to be installed on the tank

4 Put into operation the LC300 Server

4.1 Put the batteries

4.2 Put the SIM-Card
Warning : Switch off the PIN-Code for the SIM-card !!!
You can use all kind of SIM-Cards : prepay cards, contractual cards, etc.

4.3 Now you have to enter the parameters. To do so, you have two possibilities :
- directly via the two buttons of the LC 300
- with S,C and T SMS's from a cellular phone or the PC with a modem

4.3.1 Settings via the LC300 buttons
There are two levels of settings on the LC300 Server
- general settings (Handy/DataCenter-Mode,Freq.,Date & Time,measurement Time,Period icy SMS,Phone No)
- CS settings (CS ON/OFF, tanktype, volume, height, offset, min.Alarm, max.Alarm)

4.3.1.1 General settings
> if the LC is sleeping, press shortly the "Mode" button; If the LC isn't sleeping, go directly to the next step
> press the "Mode" button till the display is showing "setup" (3 sec.)
> with the "Mode" button you can now step from one position to the other. To change the value of a flashing digit, press the "Arrow" button several times till you have found the requested value !

4.3.1.2 CS settings
> use the same procedure as explained in 4.2.1.1 ; but press the "Mode" button till the display is showing S 1 ; set only those CS which will be installed ! 0 = disable / 1 = enable

4.3.2 Settings with the S,C,T SMS's from a cellular phone or a PC with modem
Below described SMS formats will be sent to the LC300 Server ; the LC300 Server will always send a confirmation SMS back (with the set values) ;
Important : If you want to keep the value of a certain field, you can just substitute it with a "x"

4.3.2.1 S-SMS (general Server settings)
S1,0,1231,2009,1625,1605,1,33123456789,49123456789,

GSM / Handy- or DataCenter-Mode :	1=Handy	2 = DataCenter-Mode 0 = GSM OFF (not accepted)
RF	1=434, 2=430.5, 3=437.5, 4=439.5 Mhz (if sent by SMS this value will not be taken in consideration ; but the answer SMS will show the set value !)	
Date & time	31.12.2009,16:25	
Measurement time	16:05	
Period icy of the control SMS	1 = weekly	0 = monthly 2 = two weekly 3 = daily
Phone number in France	+33123456789	
Phone number in Germany	+49123456789	

4.3.2.2 C-SMS (CS settings) (one S-SMS per installed Clever Sensor needed)
C3,1,1,2000,120,10,25,82,

Clever Sensor with the Address	3	
CleverSensor enable	1	0 = disable
Tankshape rectangular	1	2 = cylindrical horizontal / 3 = cylindrical vertical
Tank Volume in liters	2000	
Tank height / diameter in cm	120	
Offset	10	
Low level Alarm in %	25	
High level Alarm in %	82	

4.3.2.3 T-SMS (Recipient phone number setting) Warning : x-substitution not working !
T+33123456789,+49123456789,

Phone number of first recipient	+33123456789
Phone number of second recipient	+49123456789

4.4 Make a Data-Reset (see point 2)
The LC300 Server is now ready for operation ; press the "Arrow" button to make a test ; within 10 seconds the LED's of the CS should flash, means the CS's are measuring and sending the data to the Server !

5. Important to know

5.1 Error Codes (if the displayed Error-Code is not in the list below, the LC has a combination of Errors)

5.1.1 LC300 Server "SU" :
0 = OK
2 = problem with SMS recipient 1
3 = problem with SMS recipient 2
4 = RF not working
5 = battery low (below 8%)

5.1.2 Clever Sensor :
0 = OK (if the displayed Error-Code is not in the list below, the LC has a combination of Errors)
1 = not available
2 = ultrasonic measurement problem
3 = ultrasonic measurement out of setting
4 = RF not responding
5 = battery low (below 8%)

5.2 Batteries
Battery voltage 6.0 V = 100% / battery voltage 5.05 V = 0%
The Alarm will be set active when the percentage is at 8% (5.15V); this means that there is still 8% life-time available (depending the settings and the GSM network 1 to 2 months remaining) !

5.3 SMS Types (outgoing)

5.3.1 Control SMS
LC300,1,0117,218,170310,01256,00000
0 000 00000 000 019 084 +21 0N
1 052 00500 010 100 100 +23 0N
2 085 01900 210 023 025 +15 0H
LC300,1,2 0r 3=7days contr,contr or M answer,ServerSW=01.17,CSsw=2.18,date,ServerID=1256,messageID=00000
Server Info : 19=GSM Signal strength, 084=Battery Level in %,21=Temperature,ErrorCode
CS=1,%=52,VolumeL=500,averageCons.=10,DistanceCm=100,BatteryLevel%=100,Temp=23,Error=0,Alarm=NO
CS=2,%=85,VolumeL=1900,averageCons.=210,DistanceCm=23,BatteryLevel%=25,Temp=15,Error=0,Alarm=HIGH

5.3.2 Alarm / Error SMS (Error Codes see 5.1)
LC300,4,0117,0218,01256,00000
S0 ER 9
S2 LO 13
S3 ER 4
S5 HI 85
LC300,2=Alarm/ErrorSMS,ServerSW=01.17,CSsw=02.18,ServerID=1256,messageID=00000
ServerBattery = LOW
CS2 = LOW Level Alarm 13% remaining
CS3 = RF not responding
CS5 = HIGH Level Alarm 85% full

5.3.3 S-Answer SMS
LC300,5,0117,218,170310,01256,00000
0 0 1625 1605 1
+33123456789
+49123456789
LC300,5=S-Answer,ServerSW=01.17,CSsw=02.18,ServerID=1256,messageID=00000
HandyMode,PS=ON,actualTime=16:25,measureTime=16:05,period-icy=weekly,1.phone=France,2.phone=Germany

5.3.4 C-Answer SMS
LC300,6,0117,218,170310,01256,00000
3,1,1,2000,120,10,25,82
LC300,4=S-Answer,ServerSW=01.17,CSsw=2.18,ServerID=1256,messageID=00000
CSaddr.=3,CS=enable,Tankshape=rectang.,VL=2000,heightCm=120,Offset=10,LowLevelAl=25%,HighLevelAl=85%

5.3.5 T-Answer SMS
LC300,7,0117,218,01256,00000
+33123456789,
+49123456789
LC300,7=T-Answer,ServerSW=01.17,CSsw=2.18,ServerID=1256,messageID=00000
PhoneNumberRecipient1,PhoneNumberRecipient2

5.4 SMS Types (incoming)

5.4.1 M-Message (send a M to the LC : a measurement will be launched and the LC will send back a Control SMS)

5.4.2 RS/RC-Message (send a RS or RC to the LC : the LC will send you the S or C-SMS back, means the setting Info)

5.5 Alarm settings
minimal Alarm : 0 = OFF / Range = 1% to 39%
maximal Alarm : 100 = OFF / Range = 60% to 99%

5.6 GSM signal strength
(21-30 = very good / 7-20 = good / 1-6 = weak / 0 = no coverage)

5.7 Sleeping Mode
The LC300 Server is going in the sleeping mode if during ~ 45 sec. no button activity was detected

5.8 Telephone numbers of recipients
- the country code is always needed
- if the number is entered directly on the LC, please note :
> Due to the fact that there are different length of phone numbers it can happen that at the end of the entered number still a zero is flashing. In this case press the "Arrow button" till this digit is blank.
> now confirm it with the "Mode button"

5.9 Where the GSM-Antenna-Symbol and Signal strength is showed ?
The symbol is in the upper left corner of the display ! But it will only be active during the time a SMS is sent !

5.10 Where can the battery-level of the Clever sensors be seen ?
If the LC300 Server is waked up, on the display the data of all enabled sensors are showed !
The battery symbol is always showing the level of the batteries of the respective CS. During the date & time is showed, the battery symbol indicates the level of the Server batteries !

5.11 How can I simulate / force an Alarm-SMS for test reasons ?
Due to the fact that in the first seven days every day a SMS is sent, you can only after seven days test if a SMS is sent if an Alarm occurs !
Anyway if you want to generate a SMS do the following :
- Go in the setting mode and put the measurement time e.g. 2 Minutes ahead the actual time
- Then just wait till the measurement is launched and the SMS is sent
- repeat above until day 8
- due to the fact that now not every day a SMS is sent, you can start to test the Alarms